power source, different from said ground power source, to a state of being connected to a second power source, different from said ground power source, and a drive discharge voltage is applied between said electrodes when drive voltage pulses are to be applied between said first and second electrodes.

AS amended

REMARKS

AMENDMENTS

In accordance with the foregoing, amendments to correct form are made to the specification. Further, claim 1 has been amended to include a portion of the "drive voltage" recitation of claim 2, as hereinafter discussed, and claim 2 has been canceled. The remaining claims have been amended to improve matters of form and without change of substance.

No new matter is presented and, accordingly, approval and entry of the foregoing specification and claim amendments are respectfully requested.

STATUS OF CLAIMS

All of the pending claims herein, namely claims 1-26, are rejected in item 2 of the Office Action for anticipation under 35 USC § 102(b), by Andoh et al., U.S. Patent Number 4,044,349 (hereinafter Andoh) and in item 3 of the Office Action for anticipation, on that same statutory basis, by Sakuma, U.S. Patent Number 4,384,287.

The rejections are respectfully traversed.

DRIVER CIRCUIT OPERATION; CLAIM 1 (AS AMENDED)

According to the present invention, a driver circuit for the first and second electrodes applies drive voltage pulses to the first and second electrodes in order to generate a plasma discharge. The process of the plasma discharge is that, first, a capacitor between the first and second electrodes is charged by applying a certain drive voltage pulse to the first and/or second electrodes, a plasma discharge is generated between the electrodes due to the charge, and then the capacitor is discharged by terminating the application of the drive voltage pulse. In both of the charging and the discharging the capacitor, the current should not pass through the ground conductor, to avoid generating noise at the ground level. (It should be noted that the

discharge of the capacitor is different from the plasma discharge.)

Original claim 1 relates to the above charging process, whereas original claim 2 relates to the above discharging process. The foregoing amendment to original claim 1, to incorporate therein the operative recitation of claim 2 relating to the application of a drive voltage, accordingly incorporates within claim 1 (as amended) a combination of both the capacitor charging and discharging operations.

THE PENDING CLAIMS PATENTABLY DISTINGUISH OVER THE REFERENCES

Andoh et al. discloses in Fig. 1 an electrode arrangement of a gas discharge panel having a driving circuit and, in Figs. 4a-4d, waveforms of operating voltages applied by the driving circuit to the electrodes of a display panel. More particularly, as shown in Figs. 4C and 4D, the voltage of the X electrode, Vxs, and the voltage of Y electrode, Vys, shift from an intermediate level to +Vsa/2 and then again to the intermediate level. This intermediate level is a ground level, as is readily apparent from the text and the drawings. Particularly, as described at col. 6, lines 7 and 8, "...by applying a write-in pulse voltage having the amplitude of 1/2 Vw..." and according to Fig. 1 in which a positive power supply +1/2 Vw and a negative power supply -1/2 Vw are applied to the Y Address Driver 111 and the X Address Driver 110, it is clear that the intermediate levels Vxw and Vyw are the ground level. This is similarly evident from the description at col. 5, lines 61 and 62; "...which alternately apply pulse voltages of +1/2 Vsa and -1/2 Vsa..." from which, again, it is clear that the intermediate levels Vxs and Vys are the same ground level.

Although there is no indication of the ground level in the sustain driver circuit 112, the driving pulse clearly is shown to have the ground level as a reference, and hence, there must be an undisclosed circuit to apply the ground level to the X and Y electrodes.

Therefore, in the PDP of Andoh et al., since the X and Y electrodes are connected to the ground level when the drive pulse is terminated, the discharge current of the capacitor passes through the ground conductor, generating ground noise. Andoh et al. thus does not disclose the claimed invention and, instead, suffers from the very deficiencies of the prior art addressed in the present application and, correspondingly, constitutes a "teaching-away" from the present invention.

In Sakuma, driver circuits are illustrated in Fig. 6 and relating driving pulses in Figs. 7C

and 7D. Further, the driving pulse of Fig. 7E is a composite, or combination, of the pulses of Figs. 7C and 7D. (See col. 5, lines 29-39)

It should be noted that the driving pulses of Figs. 7C and 7D are the same as the prior art pulses shown in Fig. 24 in the present application. Therefore, it is clear that Sakuma does not disclose the present invention, in which the drive circuit connects the first and second electrodes to a power sources different from ground, when applying drive voltage pulses and when completing the application of the drive voltage pulses.

In Sakuma, although the driver circuit of Fig. 9 connects the output 3 to +Vi and -V2, there is no disclosure how this driver circuit is applied to the electrodes. Moreover, there is no illustration of a waveform such as in Figs. 4A, even as to the first embodiment (and see related Figures 5A, 6A and 7A as to subsequent embodiments). Accordingly, it is respectfully submitted that Sakuma does not anticipate the present invention nor does it suggest or render same obvious.

CONCLUSION

There being no other objections or rejections, it is submitted that the application is in condition for allowance, which action is earnestly solicited.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: April 24, 2002

By: _____
H. J. Staas
Registration No. 22,010

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

CERTIFICATE UNDER 37 CFR 1.8(a)

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on _____, 20__
STAAS & HALSEY
By: _____
Date: _____

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please AMEND the paragraph beginning at page 7, line 1, as follows:

To achieve at least one of the stated objects, in accordance with the present invention, drive voltage pulses, [i.g.] i.e., discharge voltage pulses, are applied between a pair of electrodes by driving a first power source having a specific voltage from a state in which the electrodes are maintained at the potential of a reference power source that is different from the potential of [the] a ground power source, and then returning it to the reference power source. As a result, the gas discharge current or capacitance charging and discharging current accompanying the application of the drive voltage pulses is prevented from flowing to the first power source line. The above-mentioned gas discharge current or capacitance charging and discharging current resulting from the application of the drive voltage pulses flows to the first power source or the reference power source electrically separated from the ground power source, and does not flow to the ground power source line, so no noise is generated on the first power source.

Please AMEND the paragraph beginning at page 11, line 27, as follows:

The control circuit 30 has a display data control portion 32, a scanning driver control portion 34, a common driver control portion 36, and so on, and is supplied with clock pulses CLK, display data DATA, vertical synchronization signals Vsync, horizontal synchronization signals Hsync, and so on from a computer, a tuner, or the like. The display data control portion 32 receives the display data DATA and performs the required A/D conversion, intensity level adjustment, data conversion, and so forth, and supplies data signals for display to the address driver [22] 23. The scanning driver control portion 34 supplies scanning control signals to the scanning driver 26 in synchronization with the synchronization signals. The common driver control portion 36 produces control signals for the application of write pulses or erase pulses during the reset period and for the application of sustaining pulses during the sustaining discharge period, and supplies these control signals to the drivers [24] 25 and 28.

Please AMEND the paragraph beginning at page 12, line 8, as follows:

Figures 4A and 4B illustrate [Figure 4 is a diagram illustrating] the first drive method in this embodiment. This is an example of sustaining pulses applied between the X electrodes and Y electrodes. Figure 4A illustrates the drive waveforms of the address electrodes A and the X and Y electrodes, and Figure 4B illustrates the path of the discharge current and the drive circuit of the X and Y electrodes. With the first drive method in [Figure 4] Figures 4A and 4B, the X and Y electrodes are both maintained at a negative first power source potential -V1 that is different from the ground power source GND, and are alternately driven to a positive second power source potential +V2 and then returned to the first power source potential -V1. To this end, power sources V2 and V1, which use the ground power source GND as a reference, are provided in the drive circuit, and the first power source potential V1 and the second power source +V2 constitute a power source line that is electrically separate from the ground power source line GND.

IN THE CLAIMS:

Please CANCEL claim 2.

Please AMEND the following claims:

1. (ONCE AMENDED) A plasma display panel device having first and second electrodes provided apart from one another and a ground power source, and performing display by generating a discharge between said first and second electrodes, said plasma display panel device comprising:

a drive circuit that connects said first and second electrodes to power sources that are different from said ground power source so as to apply a drive voltage between the two electrodes, when drive voltage pulses are to be applied between said first and second electrodes and so as to apply a drive voltage between the two electrodes, upon completion of the application of drive voltage pulses after said drive voltage pulses have been applied between said first and second electrodes.

3. (ONCE AMENDED) A plasma display panel device having first and second electrodes provided apart from one another and a ground power source, and performing display by generating a discharge between said first and second electrodes, said plasma display panel device comprising:

a drive circuit that changes said first and second electrodes from a state of being

connected to a first power source, different from said ground power source, to a state of being connected to a second power source, different from said ground power source, so as to apply a drive voltage between the two electrodes[,] when drive voltage pulses are to be applied between said first and second electrodes.

4. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 3, wherein:

said drive circuit returns said first or second electrodes to a state of being connected to said first power source upon completion of the application of said drive voltage pulse.

5. (ONCE AMENDED) A plasma display panel device having first and second electrodes provided apart from one another and a ground power source, and performing display by generating a discharge between said first and second electrodes, said plasma display panel device comprising:

a drive circuit that changes said first and second electrodes from a state of being connected to a first power source, different from said ground power source, to a state of being respectively connected to second and third power sources, different from said ground power source, so as to apply a drive voltage between the two electrodes[,] when drive voltage pulses are to be applied between said first and second electrodes.

6. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 5, wherein:

said drive circuit returns said first and second electrodes to a state of being connected to said first power source upon completion of the application of said drive voltage pulse.

7. (ONCE AMENDED) A plasma display panel device having first and second electrodes provided apart from one another and a ground power source[,] and performing display by generating a discharge between said first and second electrodes, said plasma display panel device comprising:

a drive circuit that changes said first and second electrodes from a state of being connected to first and second power sources, different from said ground power source, to a state of being connected to a third power source, different from said ground power source, so as to apply a drive voltage between the two electrodes[,] when drive voltage pulses are to be

applied between said first and second electrodes.

8. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 7, wherein:

said drive circuit returns said first or second electrode to a state of being connected to said first or second power source upon completion of the application of said drive voltage pulses.

9. (ONCE AMENDED) A plasma display panel device having first and second electrodes provided apart from one another and a ground power source[,] and performing display by generating a discharge between said first and second electrodes, said plasma display panel device comprising:

a drive circuit that changes said first and second electrodes from a state of being connected to first and second power sources, different from said ground power source, to a state of being respectively connected to third and fourth power sources, different from said ground power source, so as to apply a drive voltage between the two electrodes[,] when drive voltage pulses are to be applied between said first and second electrodes.

10. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 9, wherein:

said drive circuit returns said first and second electrodes to a state of being respectively connected to said first and second power sources upon completion of the application of said discharge voltage pulse.

11. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 5, wherein:

reversed-polarity discharge voltage pulses are applied to said first and second electrodes.

12. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 7, wherein:

reversed-polarity discharge voltage pulses are applied to said first and second electrodes.

13. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 9, wherein:

reversed-polarity discharge voltage pulses are applied to said first and second electrodes.

14. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 1, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

15. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 2, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

16. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 3, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

17. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 5, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

18. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 7, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

19. (ONCE AMENDED) The plasma. display panel device according to [Claim] claim 9, further having a control portion that is connected to said ground power source and that supplies a control signal to said drive circuit.

20. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 3, wherein:

the potential of said ground power source is between the potential of said first power

source and the potential of the second power source, and a third electrode is maintained at the potential of the ground power source during the application of said drive voltage pulse.

21. (ONCE AMENDED) The plasma display panel device according to [Claim] claim 5, wherein:

the potential of said ground power source is between the potential of said first power source and the potential of the second power source, or is between the potential of said first power source and the potential of the third power source, and a third electrode is maintained at the potential of the ground power source during the application of said drive voltage pulse.

22. (ONCE AMENDED) A plasma display panel device that performs display by discharge between first and second electrodes provided adjacently along [the] a display line, said plasma display panel device comprising:

a control circuit, connected to a ground power source, for generating a control signal; and

a drive circuit that drives said first and second electrodes in response to said control signal[,] wherein, when drive voltage pulses are to be applied to said first or second electrode, said drive circuit supplies [the] a start voltage of said drive voltage pulses from a first power source that is different from said ground power source to said first or second electrode, and supplies [the] an end voltage of said drive voltage pulses from a second power source that is different from said ground power source.

23. (ONCE AMENDED) A plasma display panel device according to [Claim] claim 22, further comprising:

an address electrode [provided] intersecting with said first and second electrodes, wherein the address electrode is maintained at the ground potential, between the potentials of said first and second electrodes, when said drive voltage pulses are to be applied to the first and second electrodes.

24. (ONCE AMENDED) A method for driving a plasma display panel device having first and second electrodes provided apart from one another and a ground power source[,] and performing display by generating a discharge between said first and second electrodes, wherein:

said first and second electrodes are connected to a power source that is different from said ground power source and a drive voltage is applied between said electrodes when drive voltage pulses are to be applied between said first and second electrodes.

25. (ONCE AMENDED) A method of driving a plasma display panel device having first and second electrodes provided apart from one another and a ground power source[,] and performing display by generating a discharge between said first and second electrodes, wherein:

said first and second electrodes are connected to a power source that is different from said ground power source and a drive voltage is applied between said electrodes upon completion of the application of drive voltage pulses after said discharge voltage pulses have been applied between said first and second electrodes.

26. (ONCE AMENDED) A method of driving a plasma display panel device having first and second electrodes provided apart from one another and a ground power source, and performing display by generating a discharge between said first and second electrodes, wherein:

said first and second electrodes are changed from a state of being connected to a first power source, different from said ground power source, to a state [in which the first or second electrode is] of being connected to a second power source, different from said ground power source, and a drive discharge voltage is applied between said electrodes when drive voltage pulses are to be applied between said first and second electrodes.